Schumacher® Owner's Manual

Battery Charger Models:	#SS-210A and SE-210A Fully Automatic Onboard Battery Charger For One 12-Volt Battery At 10 Or 20 Amps Or Two 12-Volt Batteries At 10 Amps For 12V And 24V Battery Systems

–Save–
Important Safety Instructions

WARNING – RISK OF EXPLOSIVE GASES

Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason, it is of utmost importance that each time before using your charger, you read this manual and follow the instructions exactly.

To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary markings on these products and on engine.

WARNING: Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. ***Wash hands after handling***.

A. GENERAL BATTERY SAFETY

1. Before you use your battery charger, read and follow all instructions and cautions printed on:
   - Battery Charger
   - Battery
   - Unit using battery
2. Use battery charger on Flooded Wet Cell, Maintenance Free and Starved Electrolyte batteries only. Charger is not intended to supply power to low-voltage electrical system other than for charging and maintaining batteries.

   WARNING: Do not use battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
3. Use only attachments recommended or sold by manufacturer. Use of non-recommended attachments may result in fire, electric shock, or injury.
4. When disconnecting the battery charger, pull by the plug not by the cord. Pulling on the cord may cause damage to cord or plug.
5. Locate battery power cord so it cannot be stepped on, tripped over, or subjected to damage or stress.
6. Do not operate charger with damaged cord or plug. Have cord replaced immediately.
7. Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way. Take it to a qualified professional for inspection and repair.
8. Do not disassemble charger. Take it to a qualified professional when service or repair is required. Incorrect reassembly may result in electric shock or fire.
9. To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning.
10. Do not use an extension cord unless absolutely necessary. Use of an improper extension cord could result in fire or electric shock. If an extension cord must be used, make sure that:
    - Pins on plug of extension cord are the same number, size, and shape as those of plug on charger.
    - Extension cord is properly wired and in good electrical condition.
    - Wire size is large enough for AC ampere rating of charger, as specified below:

Length of cord (feet):	25	50	100
AWG size of cord:	16	14	12

11. Always charge battery in a well-ventilated area.
    NEVER operate in a closed-in or restricted area without adequate ventilation.
12. Locate charger as far away from battery as DC charger cables permit.
13. **NEVER** charge a frozen battery. If battery fluid (electrolyte) is frozen, bring into a warm area to thaw before charging.
14. **NEVER** allow battery acid to drip on charger when reading specific gravity or filling battery.

    WARNING: Battery chargers get hot during operation and must have proper ventilation. Air needs to flow around the charger. Do not set on flammable items like carpeting, upholstery, paper, cardboard, etc. Will damage leather and melt plastic and rubber.

SCHUMACHER ELECTRIC CORPORATION
801 BUSINESS CENTER DRIVE • MOUNT PROSPECT, ILLINOIS 60056-2179
Send Warranty Product Repairs to: 1025 E. Thompson, Hoopeston, IL 60942-0280
Call Customer Service if you have questions: 1-800-621-5485

00-99-000329/0203

B. PERSONAL PRECAUTIONS AND SAFETY

1. Wear complete eye protection and clothing protection when working with lead-acid batteries.
2. Make sure someone is within range of your voice or close enough to come to your aid when you work with or near a lead-acid battery.
3. Have plenty of fresh water and soap nearby for use if battery acid contacts skin, clothing, or eyes. If battery acid contacts skin or clothing, wash immediately with soap and water.
4. Avoid touching your eyes while working with a battery. Acid particles (corrosion) may get into your eyes! If acid enters your eye, immediately flood eye with running cold water for at least 10 minutes. Get medical attention immediately.
5. Remove all personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring (or the like) to metal, causing a severe burn.
6. Take care not to drop a metal tool or other metal onto the battery. Metal may cause sparking or short circuit the battery or another electrical device. Sparking may cause an explosion.
7. Always operate battery charger in an open, well- ventilated area.
8. **NEVER** smoke or allow a spark or flame in the vicinity of the battery or engine. Batteries generate explosive gases.
9. **NEVER** charge a frozen battery.

WARNING: EXTERNAL CONNECTIONS TO CHARGER SHALL COMPLY WITH THE UNITED STATES COAST GUARD ELECTRICAL REGULATIONS (33CFR183, SUB PART1).

C. PREPARING TO CHARGE

1. If necessary to remove battery from boat or vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the boat or vehicle are off, so as not to cause an arc.
2. Clean battery terminals. Take care to keep corrosion from coming in contact with your eyes.
3. If required, add distilled water in each cell until battery acid reaches levels specified by battery manufacturer. This helps purge excess gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.
4. Study all battery manufacturers' specific precautions, such as removing or not removing cell caps while charging, and recommended rates of charge.
5. Be sure area around battery is well ventilated while battery is being charged. Using a piece of cardboard or other non-metallic material as a fan can forcefully blow gas away.

   NOTE: Not for use with "eye" type batteries.

D. CHARGER LOCATION

For best operation, the charger should be mounted vertically to the bulkhead. If the unit must be mounted horizontally, do not restrict the airflow under the charger. Do not mount the charger next to fuel tanks or below the waterline of the boat. The charger is waterproof and is approved for mounting on the weatherdeck.

To allow for proper air circulation, a minimum of four inches of unobstructed area must be permitted on all sides of the charger.

The charger is equipped with an internal thermocouple. Choosing a location that will have the same surrounding temperature as the battery(ies) is ideal and will allow for the charger to compensate the current according to the initial temperature.

Chose a location such that the six-foot cables can reach the battery(ies). If extra length is needed, bring the ring lugs to a terminal block and extend with a minimum of 14AWG cables. Choose larger wire for extended runs.

The charger weight is substantial. Ensure that the mounting surface is strong enough to support the charger. Choose a location that will allow for all six mounting holes to be used. Mounting with nuts, bolts and lock washers is preferable to screws.

Never place the charger directly above the battery being charged; gases may harm the charger over time. Never allow acid to drip on the charger when reading specific gravity or filling battery.

Do not set a battery or any other object on top of charger.

E. MOUNTING INSTRUCTIONS

The charger may be permanently mounted and connected. Six mounting holes have been provided for secure installation. Choose a location for the charger (see "CHARGER LOCATION" for proper placement). Using the charger as a template, place the charger in the selected location and mark each of the six holes with a pencil. In a well ventilated environment, drill the six holes using a #9 (7/32") drill bit for use with nuts and bolts OR with a 5/32" drill bit for use with #10 self tapping screws. Take caution of the area on the other side that you are drilling to avoid drilling into wires or other components. Using #10 bolts, nuts and lockwashers, mount the charger with the LEDs facing up on a flat vertical surface to allow for ventilation. Route the AC and DC cords to either end and avoid pinching them under the base. A sealant may be used to waterproof the screw holes.

NOTE: Mounting the charger horizontally may not allow excess heat to rise away from the charger; if the charger must be mounted horizontally, take care to ensure there is a four inch minimum clearance around all sides of charger to provide adequate ventilation.

NOTE: This charger has an internal thermocouple. If the unit gets too hot, the current will be reduced to allow the charger to cool to normal operating temperatures and restart. If the unit does not cool, the charger will temporarily shut off until normal temperatures are obtained.

F. DC CONNECTION PRECAUTION

Connect and disconnect the DC output connections only after removing the AC cord from the electric outlet.

G. DC CONNECTION PROCEDURE

When charging battery(ies) in boat, take care to determine the battery type and which pole is ground. To reduce risk of a spark near battery, follow these general steps when battery is inside boat. **WARNING:** A spark near the battery may cause battery explosion.

1. Position AC power cord and DC charging cords to reduce risk of damage.
2. Stay clear of fan blades, belts, pulleys, and other parts that can cause injury.
3. Check polarity of battery posts. Battery case will be marked to indicate each post's polarity: POSITIVE (POS, P, +) and NEGATIVE (NEG, N, -). **NOTE:** The positive battery post usually has a larger diameter than the negative post.
4. Determine which post of battery is ground.
5. Connect POSITIVE (RED) ring terminal from battery charger to POSITIVE (POS, P, +) post of battery.
6. Connect NEGATIVE (BLACK) ring terminal to NEGATIVE (NEG, N, -) post of battery
7. When disconnecting the charger, disconnect the AC power cord from the electric outlet first.
8. While disconnecting output leads from the batteries, always do so in reverse order of the connection procedure.

H. DC WIRING DETAILS

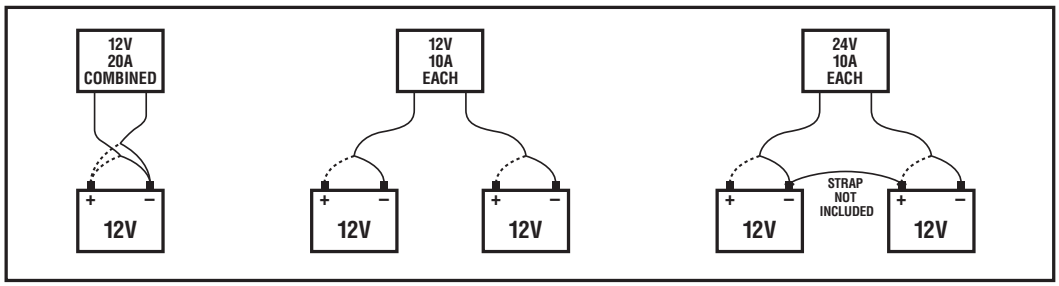
When connecting the ring terminals to the battery, remove nuts on battery posts, place the ring terminal on corresponding positive and negative post, and replace each nut tightly to ensure a good connection.

When connecting the ring terminals, connect the black 12 volt lead to the negative battery post and the red 12 volt lead to the positive battery post.

When connecting the charger to ONE battery at the 20A charge rate, connect both positive leads from each charging bank to the positive post of the battery. Connect both negative leads from each charging bank to the negative post of the battery.

When connecting the charger to TWO batteries, connect the positive lead from charging bank one to the positive post of battery one. Connect the negative lead from charging bank one to the negative post of battery one. Connect the leads from charging bank two to battery two in the same fashion. NOTE: *Removal of a strap between two batteries in a 24V system is not necessary.*

FOR DETAILED WIRING – SEE DIAGRAMS BELOW



I. INLINE FUSES

Inline fuses, located close to the ends of the red leads, protect the charger from extremely high voltage surges, lightning strikes or other high current surges. If a fuse blows, replace only with AGC-30 30A 32V 1 ¼" glass fuse.

J. GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS

Charger should be grounded to reduce risk of electric shock. Charger is equipped with an electric cord having a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER – Never alter AC cord or plug provided – if it will not fit outlet, have proper outlet installed by a qualified electrician. Improper connection can result in a risk of an electric shock.

CAUTION – To reduce risk of fire or electric shock, connect battery charger directly to grounding receptacle (three-prong). An adapter should not be used with battery charger.

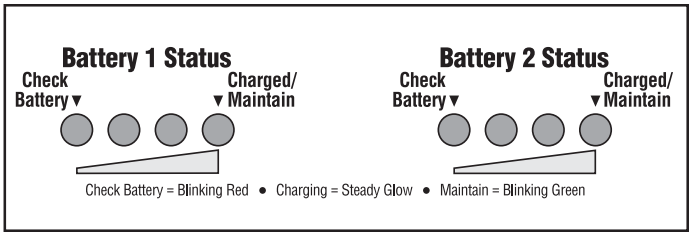
K. OPERATING INSTRUCTIONS

Once the unit has been properly connected to the battery(ies), plug in the charger to AC power. Initially all 4 LEDs on both charging banks will turn on in sequence. The battery charger will perform a self test and light the two yellow LEDs in sequence next. The charger will then go into a battery diagnostic mode to determine if the battery(ies) are independent or connected in series (24V) or parallel (12V). NOTE: *It is important to not operate any electrical devices on the boat during the first 30 seconds after plugging in the charger while it is diagnosing the battery(ies).* Once the diagnostics are complete, the charger will begin charging the battery(ies) if needed. Each bank has an independent display of LEDs and will show the charge status of the battery. NOTE: *When both output leads are connected to one battery, only charging bank one will display the charge status of the battery.*

L. LED DISPLAY

Red blinking (slow) – indicates check battery connection or blown fuse
Red blinking (fast) – indicates error, abort stage
Red solid – charger is charging, current at maximum
Yellow #1 solid – charger is charging, voltage >14.2 volts
Yellow #1 blinking – desulfation mode
Yellow #2 solid – charger is charging, constant voltage
Green solid – charger is in final 3-hour charge. 95% charged
Green blinking – charge complete maintain stage

NOTE: *When both output leads are connected to one battery, only channel one will display the charge status of the battery.*



M. AUTOMATIC CHARGE MODE

The automatic charger uses a three-step charging process. During the BULK charge phase, the charger attempts to deliver 10/(20) amps of current to the battery(ies) until the battery voltage levels off. At this point, the charger enters the ABSORPTION charge phase. In this phase, the charger will hold the battery voltage constant and let the battery determine the charging current. When the charging current stabilizes, the charger will continue to charge for three hours to bring the battery up to full charge. The charger will then automatically enter the MAINTAIN MODE. During this phase, the charger will hold the battery voltage constant at 13.2 volts to guard against self-discharge of the battery. The charge current will typically be a few tenths of an amp.

N. DESULFATION MODE

If the battery has been left discharged for an extended period of time, it may have become 'SULFATED'. If the battery voltage is less than 12.2 volts prior to being charged, and the voltage climbs rapidly when charging begins, the battery may be SULFATED. Under this condition, the charger enters DESULFATION MODE; this is indicated by the first YELLOW LED blinking. In DESULFATION MODE, the initial charging current is very small. The charger will stay in DESULFATION MODE for up to 24 hours, attempting to break down the sulfation. If the battery current increases to normal in this time, the charger will enter the normal AUTOMATIC MODE. If the current does NOT increase to normal, the charger will enter the ABORT state and will shut off. The rapid flashing of the RED LED indicates the ABORT state and the battery may need to be replaced. The charger will remain in abort until the AC power is removed.

O. EXTENDED BATTERY STORAGE

The charger will draw a small amount of current from the battery(ies), a few milliamps, when not charging or maintaining. If the battery(ies) are going to be stored for an extended period of time (several months) without being charged, it is best to disconnect the leads or remove the fuse to keep the charger from discharging the battery(ies) over time.

P. MAINTENANCE / CLEANING INSTRUCTIONS

Very little maintenance is required for the battery charger. Use common sense in wiping the charger clean and store in a clean, dry area.

1. After use, use a dry cloth to wipe all battery corrosion and other dirt or oil from terminals, cords, and the charger case.
2. Coil charger cords to prevent damage.
3. Have any cracked or frayed cords replaced by a qualified professional.
4. Store battery charger in a clean, dry area.

LIMITED WARRANTY

SCHUMACHER ELECTRIC CORPORATION, 801 BUSINESS CENTER DRIVE, MOUNT PROSPECT, ILLINOIS 60056-2179 MAKES THIS LIMITED WARRANTY TO THE ORIGINAL PURCHASER AT RETAIL OF THIS PRODUCT. THIS LIMITED WARRANTY IS NOT TRANSFERABLE.

Schumacher Electric Corporation warrants this battery charger for two years from date of purchase at retail against defective material or workmanship. If such should occur, the unit will be repaired or replaced at the option of the manufacturer. It is the obligation of the purchaser to forward the unit together with proof of purchase, transportation and/or mailing charges prepaid to the manufacturer or its authorized representative.

This limited warranty is void if the product is misused, subjected to careless handling, or repaired by anyone other than the manufacturer or its authorized representative.

The manufacturer makes no warranty other than this limited warranty and expressly excludes any implied warranty including any warranty for consequential damages.

THIS IS THE ONLY EXPRESS LIMITED WARRANTY AND THE MANUFACTURER NEITHER ASSUMES NOR AUTHORIZES ANYONE TO ASSUME OR MAKE ANY OTHER OBLIGATION TOWARDS THE PRODUCT OTHER THAN THIS EXPRESS LIMITED WARRANTY. THE MANUFACTURER MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE OF THIS PRODUCT AND EXPRESSLY EXCLUDES SUCH FROM THIS LIMITED WARRANTY.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LENGTH OF IMPLIED WARRANTY SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.